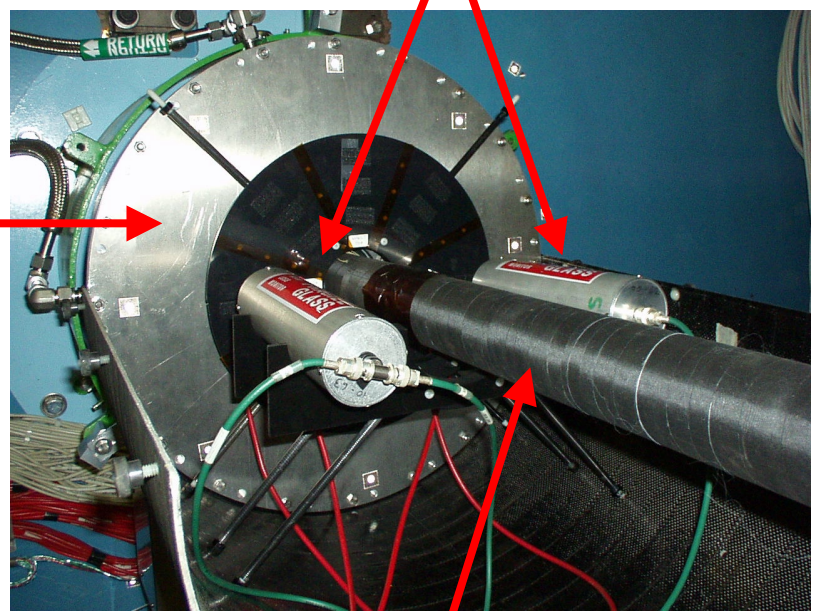
The Radiation Monitoring and Abort System

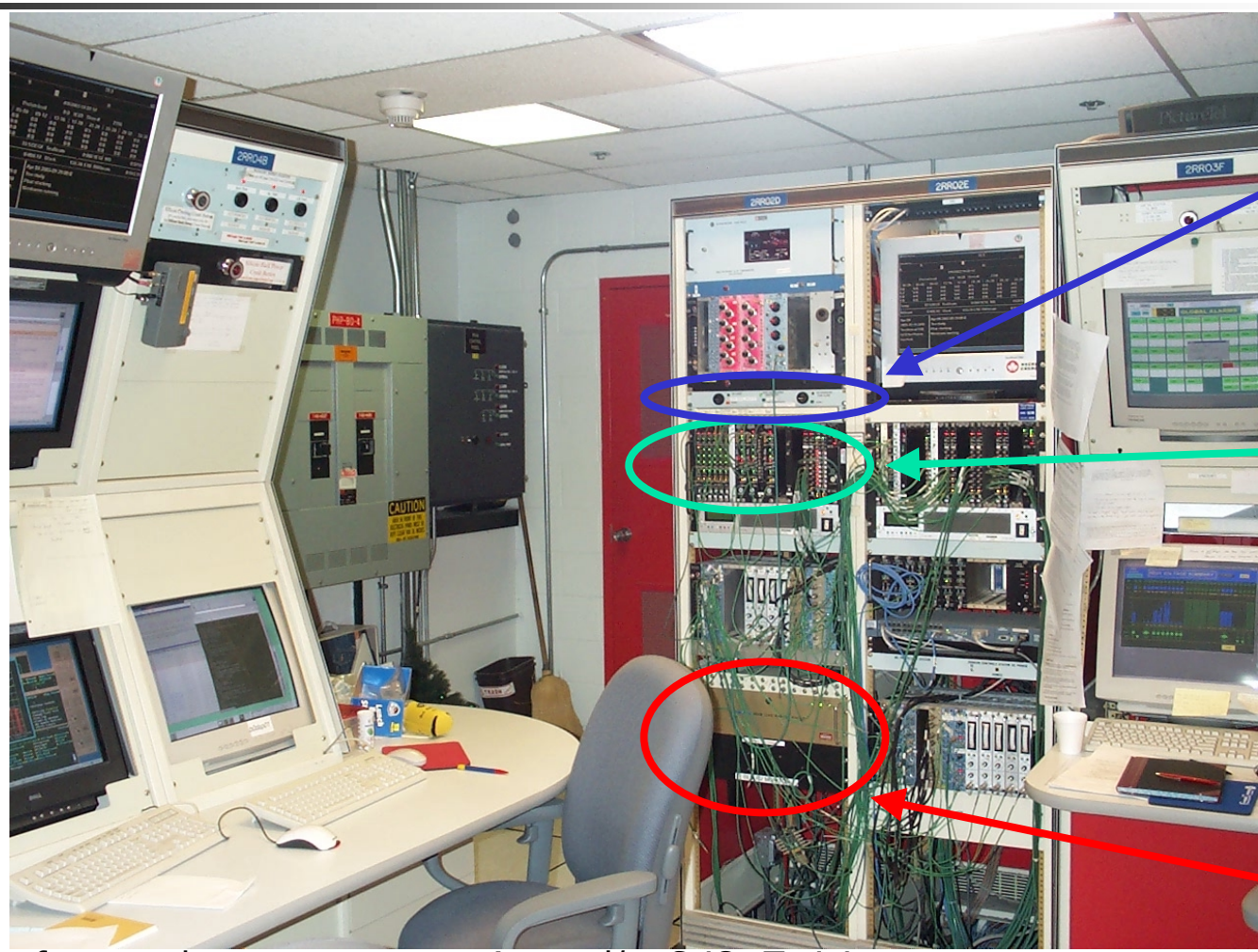
The Shift Crew's Responsibilities

The hardware



- Beam Loss Monitors: two on E, two on W
- Output signal prop. to dose rate
- Amplified/digitized in CAMAC in control room
- Read out via ACNET

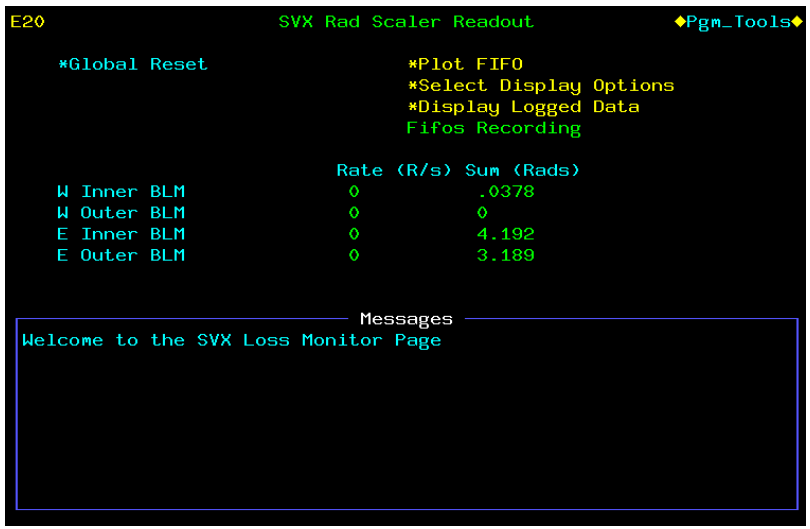
The electronics



What the system does

- Compares dose rate against programmable threshold
  - If dose rate too high, abort the beam
- Compares dose integrated over past minute against programmable threshold
  - If dose too high, sound alarm
- Keeps continuous record of integrated dose

Monitoring



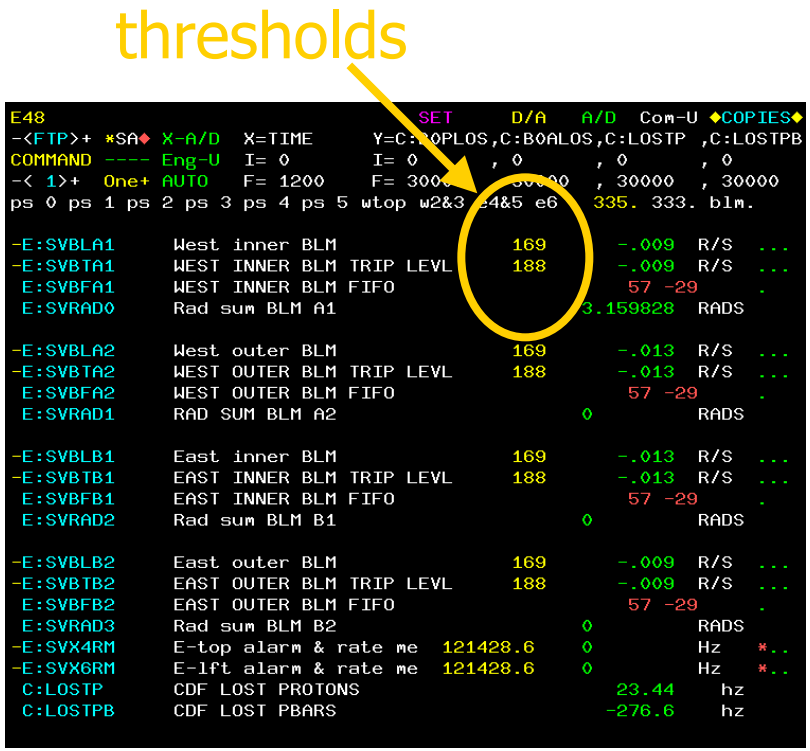
- ACNET E20 shows real-time readings
- Whenever beam in TeV, you must monitor integrated doses (E:SVRAD0-3)
- Preferred method is a Fast Time Plot
  - Available from "SVX" menu on ACNET E-Z Writer page (E11)

What to watch for

- Anomalous behavior of the E:SVRAD's
  - In time you'll get used to what is anomalous and what isn't
- Large integrated doses w.r.t. three thresholds:
  - "CDF manual alarm" --- SciCo calls MCR
  - "MCR manual abort" --- MCR aborts beam
  - "CDF manual abort" --- CDF aborts beam

- Integrated dose alarm will probably sound before these thresholds are reached, but be vigilant anyway!

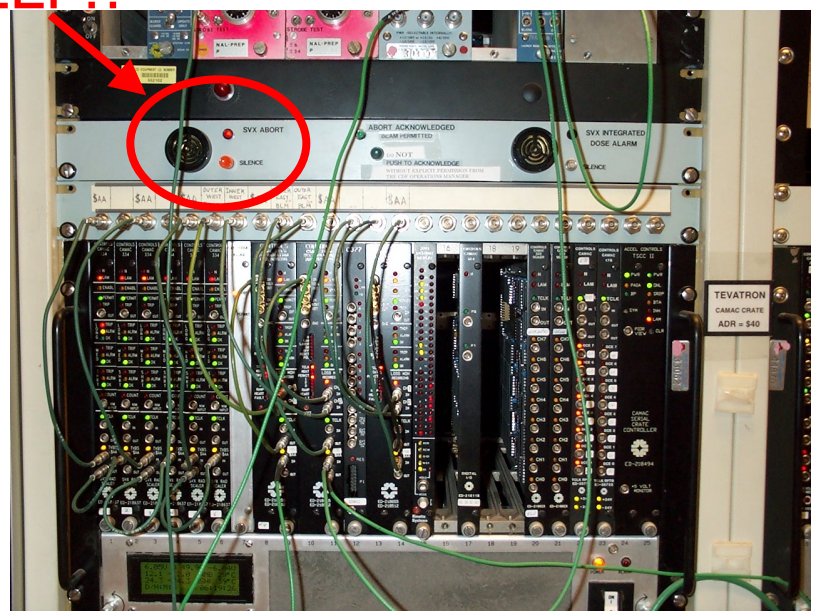
How to manually abort the TeVatron



- Step-by-step instructions on RadMon web pages
- In a nutshell:
  - Go to E48
  - Lower automated abort threshold to below pedestal
  - Let hardware take care of the rest

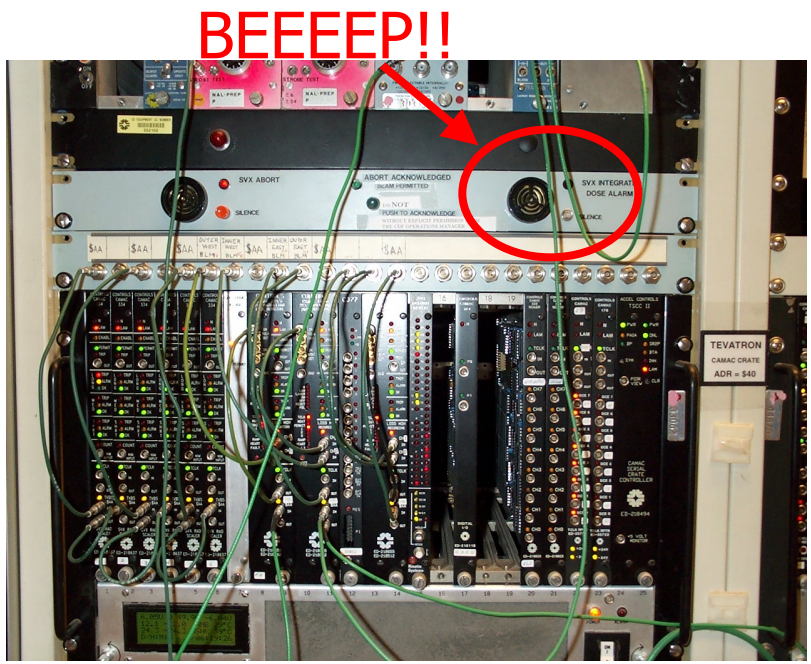
If there is an abort…

BEEEEP!!

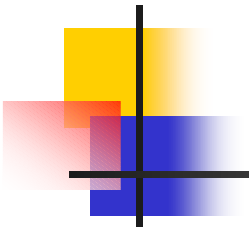


- Don't panic --- what's done is done
- Silence the sono-alarm
- SciCo calls MCR, RDCO, Ops Mgr
  - Probably a good idea to call silicon too
- Reset the system after Ops Mgr gives the OK
  - Step-by-step instructions on the RadMon web pages

If there is an alarm…



- Don’t panic --- but be concerned
- Silence the sono-alarm
- SciCo should call MCR
  - Probably a good idea to call silicon too
- Be extra-vigilant about watching the E:SVRADs



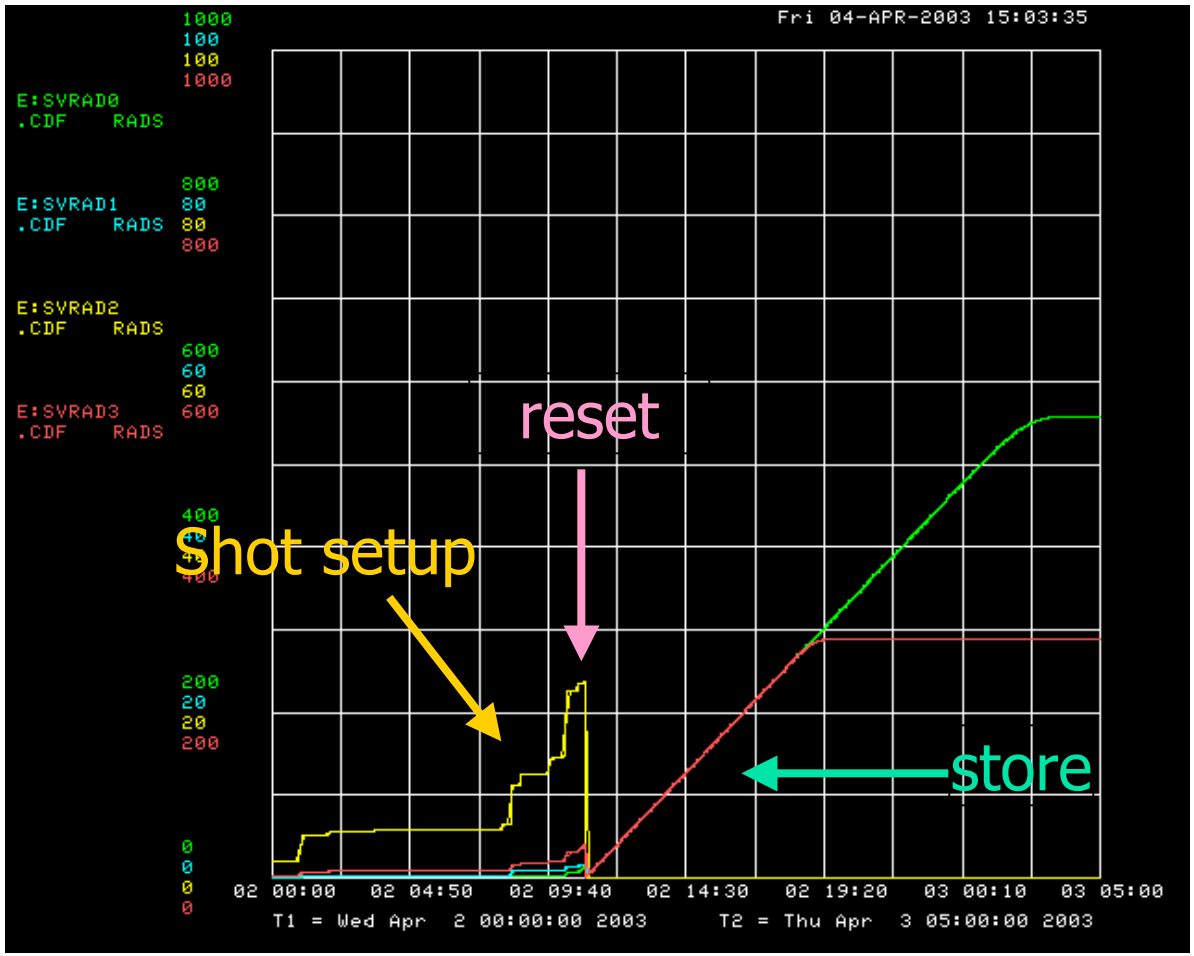
FAQ

- What are the thresholds?
  - Automated abort: 12 rad/s
  - Integrated dose alarm: 18 rad in past minute
  - Manual alarm/aborts: ~krads, depends on what MCR is doing --- see table posted by ACNET console
- How long will silicon “last?”
  - ~Mrads, so don’t worry.
- Has CDF ever pulled the manual abort?
  - Not on purpose.

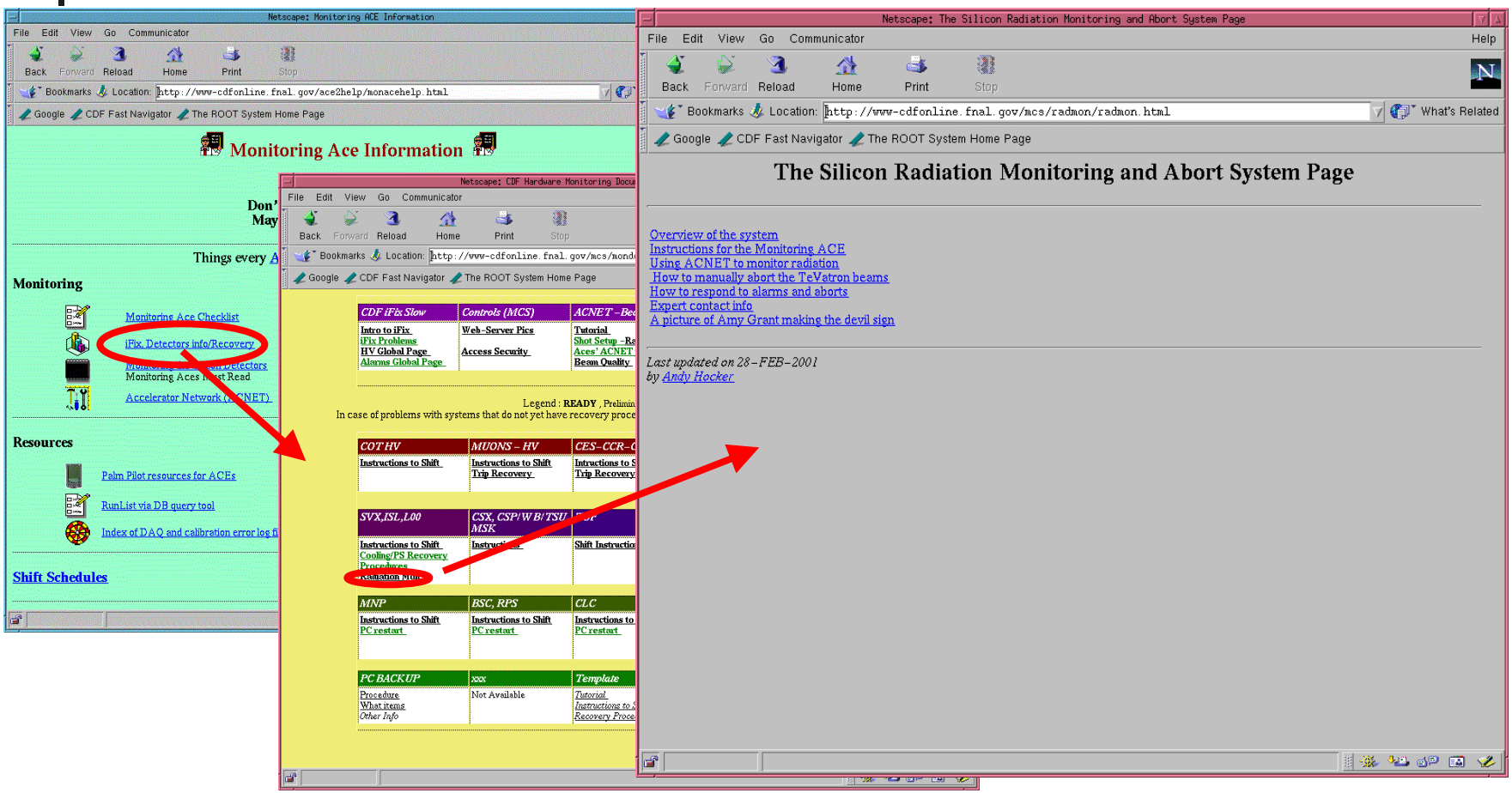
FAQ, cont.

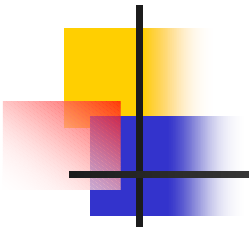
- When do the E:SVRADs get zeroed?
  - Before shot setup, after scraping, before studies --- this is done by MCR
- Why are the E:SVRADs flat and boring most of the time?
  - System geared toward catastrophic beam accidents --- tens or hundreds of rad/s
  - Typical beam losses ~mrad/s --- indistinguishable from zero --- an effective integration threshold
  - Threshold for E:SVRAD0,3 is 2 mrad/s, E:SVRAD1,2 is 8 mrad/s (long story)

Typical dose behavior



If you've forgotten everything I just said…





Summary

- Monitor E:SVRADs whenever beam in TeVatron
- If high doses observed, check them against manual alarm/abort threshold table and alert MCR
- Page RDCO for all alarms, aborts, or if something looks weird
  - Andy Hocker, Ricardo Eusebi, Eva Halkiadakis
- Take a spin through the RadMon web pages on one of those boring TeV studies shifts…